

Frogs of the state of Espírito Santo, southeastern Brazil - The need for looking at the 'coldspots'

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ABSTRACT: We present a list of the anuran amphibians of the state of Espírito Santo, southeastern Brazil. The list was compiled from data gathered from fieldwork over the course of the past 20 years in different localities, and from literature records and voucher specimens deposited in scientific collections. Our list comprises 133 species. Patchy sampling efforts and recent species descriptions suggest that the list may increase significantly with further sampling, considering the presence of several geographical gaps. The need for adequate sampling in these gap areas is highlighted.

INTRODUCTION

The herpetofauna of the state of Espírito Santo (Figure 1) has been object of attention since the 19th century, when naturalists, such as Spix and Wied-Neuwied visited the area. After the middle 20th Century, several reports - mostly of very specific nature - contributed to the knowledge of the local herpetofauna (Travassos 1945; Travassos and Freitas 1948; Aguirre 1951; Bokermann 1966a). The number of contributions increased gradually during the early 1980s, but is clearly biased to only a few localities. Two sites were subject to a higher sampling effort, through short or long term studies, and, not surprisingly, are the type-localities of most anuran species described from specimens collected in the state: Linhares and Santa Teresa (Wied-Neuwied 1824; Bokermann 1952, 1966b,c; 1967; Izecksohn and Cruz 1976; Cruz 1980; Izecksohn and Peixoto 1981; Cruz and Peixoto 1982; Peixoto 1982; Heyer 1984; Weygoldt and Peixoto 1985; Cruz and Peixoto 1985; Peixoto and Weygoldt 1987; Izecksohn 1988; Heyer and Wolf 1989; Izecksohn 1993; Bastos and Pombal 1996; Peixoto 2002; Napoli 2005; Cruz *et al.* 2005; Almeida and Angulo 2006; Pombal and Gasparini 2006).

New species are still described on a regular basis, even in intensively sampled areas (Pombal *et al.* 2003; Napoli 2005; Cruz *et al.* 2005; Almeida and Angulo 2006; Pombal and Gasparini 2006; Caramaschi *et al.* 2009; Izecksohn *et al.* 2009; Canedo and Pimenta 2010). A list of species occurring in Espírito Santo is still not available (Gasparini *et al.* 2007), and this prevents adequate planning of conservation strategies regarding amphibians. Through a combination of several years of fieldwork, and reviews of literature and collection records, we compiled a checklist of the anurans species of the state of Espírito Santo, which we herein present and discuss. Our contribution intends to gather most of the available information on the amphibian species richness in the state, and to identify sampling gaps.

MATERIALS AND METHODS

The state of Espírito Santo (Figure 1) is located in southeastern Brazil, occupying 45,597 km² within the Atlantic Forest domain. Its maximum length from north to south is 374 km, bordered to the east by the Atlantic Ocean, and the width varies from 130 to 150 km, with altitudes increasing from sea level, in the east, to 2,897 m in Caparaó Mountains in the west. Espírito Santo is bordered by the states of Bahia (north), Minas Gerais (west), and Rio de Janeiro (south).

There are two main geological zones: the Barreiras Formation, and the Mountain Zone (Amorim 1984). The Barreiras Formation extends over a narrow coastal stretch in the south, broader in the north, originally covered by a lowland rain forest, with a 30m-canopy; the Mountain Zone is located in the inner portions, characterized by the presence of dense rain forests, with a mean 25m-canopy (IPEMA 2005).

For the compilation of the list, we used information gathered from several localities sampled by us throughout the last 20 years in different municipalities of the state (Figure 1; Table 1); sampling effort, methods and temporal coverage varied in different localities. Additionally, we searched the following amphibian collections: Célio Fernando Baptista Haddad - Universidade Estadual Paulista, Rio Claro, SP, Brazil (CFBH); Museu de Biologia Mello Leitão - Santa Teresa, ES, Brazil (MBML); Museu Nacional, Rio de Janeiro, RJ, Brazil (MNRJ); and Smithsonian National Museum of Natural History, Washington, DC, USA (USNM) for specimens collected in Espírito Santo. We also compiled information from literature, mostly restricted to descriptions of new taxa, taxonomic reviews, and geographic distribution notes (cited where appropriate). Voucher specimens reported in the literature are deposited in the following additional scientific collections: Coleção Eugênio Izecksohn (EI), Universidade Federal Rural do Rio de Janeiro; Coleção do Departamento de Zoologia da Universidade Federal do Rio de Janeiro, Seropédica, RJ, Brazil (ZUFRJ); Coleção Zoológica da Universidade

Estadual de Campinas, Campinas, SP, Brazil (ZUEC); Coleção Herpetológica da Universidade de Brasília, Brasília, DF, Brazil (CHUNB); Museum of Comparative Zoology, Harvard University (MCZ); Museu de Zoologia da Universidade de São Paulo, São Paulo, SP, Brazil (MZUSP).

We calculated the “voucher-based richness” (only voucher records were used) for each municipality (out of a total of 78), aiming exclusively to compare the voucher richness in different regions. Municipalities were used for comparisons, even when more than one locality was involved. Although this may be seen as an inconsistency, given the disparity of size among municipalities, it was the only viable approach at this time. Several of the museum records, especially older ones, do not have detailed locality data, not allowing a more detailed analysis (*e.g.* grid cells). We also calculated the “voucher-based range” for each species, again, using only voucher records, aiming to compare the spatial coverage for the different species.

We classified as endemic the species with distribution records restricted to the state of Espírito Santo. Taxonomy follows Frost (2010).

Several distinct collection permits, throughout the time span covered here, were emitted by Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA, Instituto Estadual do Meio Ambiente - IEMA/ES and Instituto de Defesa Agropecuária e Florestal - IDAF/ES.

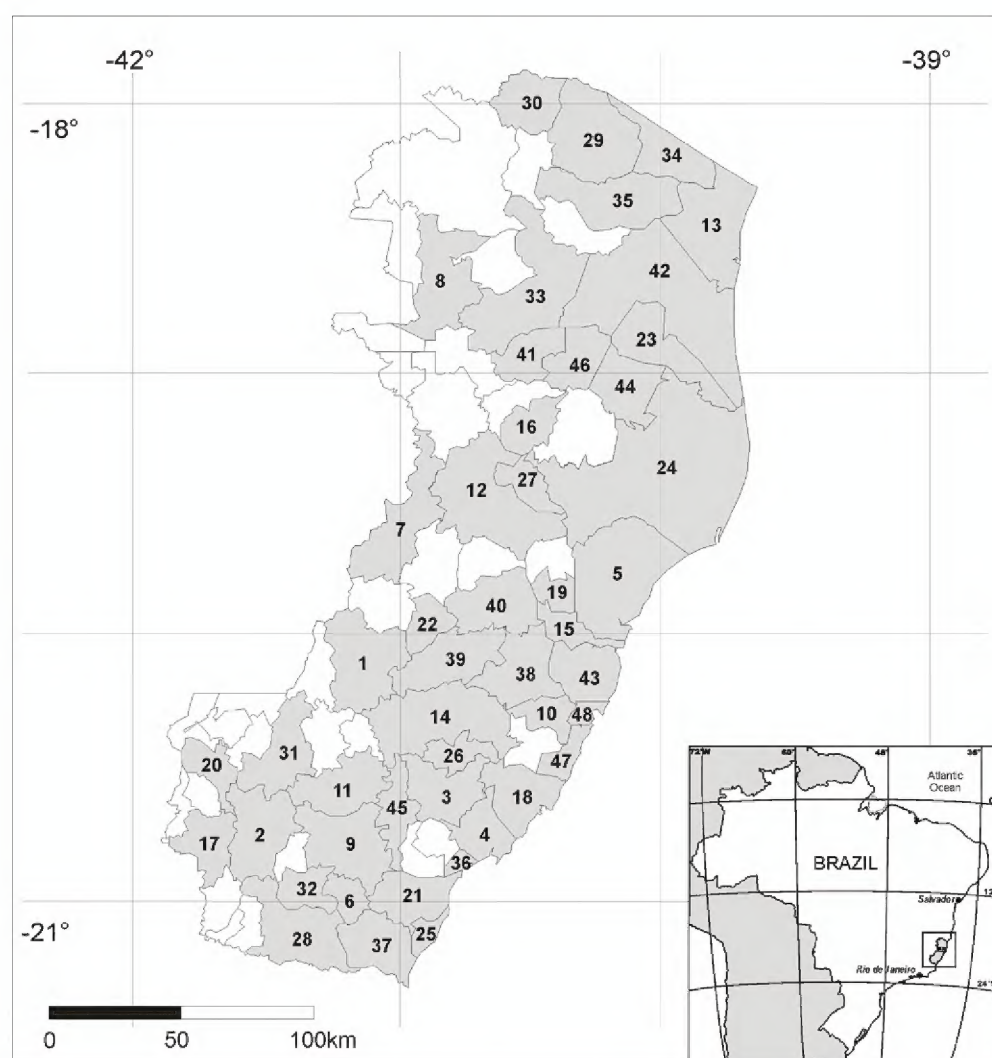


FIGURE 1. The state of Espírito Santo, showing municipalities with voucher records. 1, Afonso Cláudio; 2, Alegre; 3, Alfredo Chaves; 4, Anchieta; 5, Aracruz; 6, Atilio Vivacqua; 7, Baixo Guandu; 8, Barra de São Francisco; 9, Cachoeiro de Itapemirim; 10, Cariacica; 11, Castelo; 12, Colatina; 13, Conceição da Barra; 14, Domingos Martins; 15, Fundão; 16, Governador Lindemberg; 17, Guaçuí; 18, Guarapari; 19, Ibirapu; 20, Ibitirama; 21, Itapemirim; 22, Itarana; 23, Jaguaré; 24, Linhares; 25, Marataízes; 26, Marechal Floriano; 27, Marilândia; 28, Mimoso do Sul; 29, Montanha; 30, Mucurici; 31, Muniz Freire; 32, Muqui; 33, Nova Venécia; 34, Pedro Canário; 35, Pinheiros; 36, Piúma; 37, Presidente Kennedy; 38, Santa Leopoldina; 39, Santa Maria de Jetibá; 40, Santa Teresa; 41, São Gabriel da Palha; 42, São Mateus; 43, Serra; 44, Sooretama; 45, Vargem Alta; 46, Vila Valério; 47, Vila Velha; 48, Vitória.

RESULTS AND DISCUSSION

We found records for 133 anuran species in Espírito Santo (Table 2, Figures 2-7), distributed in 17 families and 48 genera. The following references were sources of information of voucher records for different localities in the state of Espírito Santo: Bokermann (1952); Miranda-Ribeiro (1955); Izecksohn (1982); Cruz and Peixoto (1984); Weygoldt and Peixoto (1987); Pombal and Haddad (1992); Gasparini (2002); Ramos and Gasparini (2004); Nascimento *et al.* (2005); Prado and Pombal (2005); Frost *et al.* (2006); Grant *et al.* (2006); Nascimento *et al.* (2006); Peixoto and Gomes (2007); Silva *et al.* (2007); Hedges *et al.* (2008); Silva *et al.* (2008); Faivovich *et al.* (2009); Guayasamin *et al.* (2009); Almeida and Gasparini (2010); Caramaschi (2010); Cassini *et al.* (2010); Garda *et al.* (2010);

Sixteen species are endemic to Espírito Santo, six of which are only known from their type-localities. The listed species correspond to about 14.2% of the 931 amphibian species known to occur in Brazil (Frost 2011).

The exotic species *Lithobates catesbeianus* was recorded in the wild, and, although listed as the 133rd species, is not included in the voucher-based richness analysis.

Only 48 of the 78 municipalities were represented by voucher records. The municipality with highest voucher richness was Santa Teresa, with 92 species, followed by Linhares (56) and Cariacica (50); 24 municipalities (50% of the sites with at least one voucher species) showed less than 10 voucher species (Figure 8). The majority of the species ($n = 84$; 63%) were found in only five municipalities or less (Figures 9 and 10).

This study does not intend to support any biogeographic approach, since discrepancies between sampled areas are evident, and most records lack accurate information on geographic coordinates. Moreover, our list shall not be considered definite. New records will certainly be reported as new areas are sampled and as taxonomic knowledge on several groups evolve. The information collected, compiled, and presented here, however, represents an important starting point for characterizing the frog species richness known to occur in Espírito Santo. It is likely that species richness is actually higher than that reported, as there are new species being described, and several taxonomic issues involving some species found here. We listed only species that are already described, with few notable exceptions: two new species of *Crossodactylus* and a new *Melanophryniscus*. These species are in an advanced stage of description. Other groups are more problematic and deserve closer attention and further study. Some of these are discussed below:

The *Dendropsophus microcephalus* group (sensu Faivovich *et al.* 2005) - six species of the group are known to occur in Espírito Santo: *D. berthaltutzae*, *D. bipunctatus*, *D. branneri*, *D. decipiens*, *D. haddadi*, and *D. pseudomeridianus*; there are at least two more species which we cannot confidently assign to any known species, one of which is widely distributed. Their identity, however, requires further behavioral and genetic studies.

The *Dendropsophus parviceps* group - three species of this group are known to occur in Espírito Santo: *D. giesleri*, *D. microps* and *D. ruschii*; there are subtle morphological differences between *D. giesleri* and *D. microps* (Heyer

1980), and further acoustic and genetic studies are needed to better understand the distribution of species of the group, some of which are syntopic.

The *Hypsiboas polytaenius* clade - specimens collected in different localities show considerable morphological variation, and there are probably at least two different species in Espírito Santo.

The *Scinax catharinae* group - taxonomy of the group is complex, showing marked sexual dimorphism, cryptic coloration and large morphological similarity among several species. Besides the related species (see Table 2), at least four - of which at least one is undescribed - occur in Espírito Santo. Additional broad-scale studies are needed to elucidate the identity of the species of the group.

The *Scinax perpusillus* group - recent findings show that at least two undescribed species occur in Espírito Santo (Hélio Silva, pers. comm.)

The *Scinax ruber* clade - there is significant taxonomic controversy over this clade, with several species unassigned to any species group (see Pombal et al. 1996 and Faivovich et al. 2005). The subtle differences among several species turn identification of preserved specimens difficult. Additional data, especially in life (call, coloration and behavior) are necessary to elucidate the taxonomy of the group, including several populations in Espírito Santo (e.g. Pombal et al. 1995).

Rhinella - specimens collected in southern Espírito Santo correspond morphologically to *Rhinella ornata*; however, morphological characters used by Baldissera et al. (2004) overlap in the two species reported for the region (*R. crucifer* and *R. ornata*), which suggests that it would be prudent to analyze a larger number of specimens for a clarification of the distribution of both species. There is a similar situation involving *R. schneideri* and *R. jimi* in the northern portion of the state. The original description of *R. jimi* (Stevaux 2002) imprecisely illustrates the occurrence of both species (as *Bufo ictericus* and *B. jimi*) around the area north of Rio Doce (=Doce River); there is no mention, however, of vouchers from Espírito Santo. We did not see any specimen promptly recognizable as *R. jimi* in the region. Hybridization reported among species of the genus *Rhinella* - even between species that are phylogenetically distant, as *R. ornata* and *R. icterica* (Haddad et al. 1990) - may be an additional consideration when identifying species occurring in the area. Again, a broad-scale sampling is necessary for a better understanding of the distribution of *Rhinella* species.

Conservation Remarks

Two of the species recorded are listed in the official list of Brazilian fauna threatened with extinction: *Thoropa lutzi* and *Thoropa petropolitana* (MMA 2003). *Thoropa lutzi* was recently found in the municipalities of Muniz Freire (Feio et al. 2008a) and Mimoso do Sul (personal observation), while *T. petropolitana* has not been found anywhere across its range since the 1980s (Feio 2008b). The occurrence of *T. petropolitana* outside the type-locality requires confirmation (Frost 2010), and further sampling is essential for comprehension of the distributional range and conservation status of this species.

A list of the threatened fauna of Espírito Santo was recently published (Gasparini et al. 2007) and again *T.*

lutzi and *T. petropolitana* were included. In addition, eight other species were included in the list: *Allobates capixaba* (as *Colosthetus capixaba*), *Cycloramphus fuliginosus*, *Vitreorana eurygnatha* (as *Hyalinobatrachium eurygnathum*), *V. uranoscopa* (as *Hyalinobatrachium uranoscopum*), *Dendropsophus ruschii*, *Megaelosia apuana*, *Phasmahyla exilis*, and *Phrynomedusa marginata* (Gasparini et al. 2007). Of those, three (*A. capixaba*, *D. ruschii*, and *Thoropa lutzi*) have been found in other regions since the publication of the list (our personal observation), as well as *M. apuana*, which distribution extension is presented in this volume (Santos et al. 2011).

The small vouchered richness in the vast majority of municipalities suggests that new range extensions are possible, and stresses the need for periodical review of conservation status of amphibian species in Espírito Santo. Some species have not been found in several years, and given the general concern with amphibian declines (Stuart et al. 2004; Eterovick et al. 2005; Lips et al. 2005) and extinctions one might think that this is the case in Espírito Santo. However, we are not sure whether all those cases of “missing species” are in fact declining populations, or whether they are a reflection of a sampling deficiency or even a natural population fluctuation. There is what we consider an emblematic case: Weygoldt (1989) mention that five species declined, and three disappeared (*Cycloramphus fuliginosus*, *Hylodes babax* and *H. lateristrigatus*) in mountain streams in two sites in Espírito Santo (Santa Teresa and Domingos Martins), where previous sampling revealed 13 species (Weygoldt 1986, 1989). *Cycloramphus fuliginosus* and *Hylodes babax* were, indeed, never recorded again since that time (our personal observation), but all other species have been found in subsequent years, in more than one site, and sometimes in large numbers (as is the case of *Hylodes lateristrigatus* and *Crossodactylus* spp.), stressing the importance of continuous and wide-ranging sampling and monitoring.

The record of the invasive *Lithobates catesbeianus* is probably related to incidental or intentional introduction from breeding facilities, widespread in several regions of the state; this species show a negative potential impact on native anuran communities (Silva et al. 2011), and further study is needed to better understand this threat in the state.

Local Diversity and Sampling Gaps: the need to look at the coldspots

Different patterns of amphibian distribution can be correlated to topographic features, climate, and vegetation (Duellmann 1999; Vasconcelos et al. 2010). There are several habitats in the Atlantic Forest in Espírito Santo (IPEMA 2005). A general pattern is an east-west increasing altitudinal gradient, with a variable extension in coastal eastern lowlands, larger in the north and in the south. The mountainous region is closer to the coast in the center-south area, causing an abrupt increase in altitude in that area.

The two sites with higher voucher-based richness, Santa Teresa and Linhares, correspond to distinct physiognomies (mountain rain forest and Lowland rain forest, respectively). These sites, however, do not

necessarily represent the true richest ones. Intensive sampling effort may have contributed to the higher species richness. Several neighboring municipalities, where significant forest remnants are still preserved, had a low vouchered richness, highlighting sampling limitations in Espírito Santo and a bias to the collection in just a few places.

The anuran species richness of Santa Teresa - 92 species - remains unparalleled in the Atlantic Forest (see an extensive compilation in Araújo *et al.* 2009). Our results, however, diverge from the list published by Rödder *et al.* (2007), who report 102 anuran species in Santa Teresa. This divergence is due to different factors: Rödder *et al.* (2007) listed species obtained in municipalities geographically close to, but very different from Santa Teresa; such species (*Aparasphenodon bruno*i, *Chiasmocleis schubarti*, and *Trachycephalus nigromaculatus*) inhabit lowland areas, and were not hitherto recorded in Santa Teresa. Vouchers attributed to *Physalaemus aguirrei* (MBML 2803, 2804), another typical lowland species, actually correspond to *Physalaemus crombiei*, described from Santa Teresa (Heyer and Wolf 1989). The voucher mentioned as *Proceratophrys appendiculata* (MBML 1154) corresponds to a juvenile *P. schirchii*. There are species included in the list whose original location is not clear, like *Rhinella hoogmoedi*. Two of the mentioned *Ischnocnema* species (MBML 1143 and 5737) correspond, in fact, to one single species, *I. abdita* (Canedo and Pimenta 2010). A probable new *Bokermannohyla* is included in the list (Rödder *et al.* 2007); the inclusion of two records unidentified to species level (*Bokermannohyla* aff. *nanuzae* and *Dendrophryniscus* sp.) seemed premature and both imply two additional species in the list, but the former voucher is a small juvenile, and

the recent range extension of *Bokermannohyla ibitipoca* to Espírito Santo (Moura *et al.* 2008) suggests caution in such statements. The two *Dendrophryniscus* vouchers may represent color variations, and we think that more arguments are needed to conclude for a new species. Despite such differences, anuran species richness in Santa Teresa remains the largest known in the Atlantic Forest.

Reports of range extensions have become increasingly frequent as new areas are sampled; several species until recently restricted to type localities in Espírito Santo have been recorded from the Espinhaço mountain range, in the west (Peloso and Gasparini 2006; Ferreira *et al.* 2009; Oliveira *et al.* 2009; Silva-Soares *et al.* 2009; Verdade *et al.* 2009; Ferreira *et al.* 2010; Motta *et al.* 2010; Santos *et al.* 2011). Hence, Santa Teresa may represent only the tip of the iceberg of anuran species richness in southeastern Brazil, and the assessment of biogeographical patterns is currently biased by existing knowledge gaps. Furthermore, conservation efforts based on such assessments could ignore critical areas, due to limited information. Newly described species from disturbed sites (Almeida and Angulo 2006; Caramaschi *et al.* 2009) illustrate this potential risk. It is necessary to even out conservation efforts, to ensure both the maintenance of protected areas, where new species continue to be found (e.g. Faivovich *et al.* 2010), and the recovery of devastated areas, such as northwestern Espírito Santo, a wasteland which recently revealed two new species of *Sphaenorhynchus* (Caramaschi *et al.* 2009). Such efforts involve wide-range sampling, both temporally and spatially, comprising different phytophysionomies in Espírito Santo, to achieve a better understanding of amphibian distribution and species richness. For that, we need to look also at the ‘coldspots’.

TABLE 1. Localities sampled by the authors in the state of Espírito Santo; L, long term sampling; O, occasional sampling.

MUNICIPALITY	LOCALITY	SAMPLING PERIOD	SAMPLING EFFORT
Cariacica	Reserva Biológica de Duas Bocas	1988-1989	L
Santa Teresa	Estação Biológica de Santa Lúcia	1989-2009	L
Santa Teresa	Parque Municipal de São Lourenço	2006-2007	L
Santa Teresa	Reserva Biológica Augusto Ruschi	2008-2009	L
Conceição da Barra	Parque Estadual de Itaúnas	2000-2001	L
Guarapari	Parque Estadual de Paulo César Vinha	1989-1990/ 2005-2007	L
Linhares	Reserva Biológica de Comboios	2006-2009	L
Linhares	Floresta Nacional de Goytacazes	2008-2009	L
Sooretama	Reserva Biológica de Sooretama	2006-2009	L
Vitória	Restinga de Camburi	2007	L
Domingos Martins	Pedra Azul	2004-2007	L
Aracruz	Olho D'Água	2003-2005	L
Muniz Freire		2007-2009	O
Anchieta		2009	O
Mimoso do Sul		2008-2009	O
Pedro Canário		2003	O
São Mateus	Sapê-do-Norte	1991	O
Cachoeiro de Itapemirim		2000	O
Governador Lindenberg		2003	O
Santa Maria de Jetibá		2004	O
Vargem Alta		2007-2009	O
Mucurici		2007-2009	O

TABLE 2. Anuran Amphibians of the state of Espírito Santo. E, species endemic to the state; T, known distribution restricted to type-locality.

TAXON	ENDEMISM
PIPIDAE	
<i>Pipa carvalhoi</i> (Miranda-Ribeiro, 1937)	
ELEUTHERODACTYLIDAE	
<i>Adelophryne</i> cf. <i>pachydactyla</i> Hoogmoed, Borges and Cascon, 1994	
BRACHYCEPHALIDAE	
<i>Brachycephalus alipioi</i> Pombal and Gasparini, 2006	E
<i>Ischnocnema abdita</i> Canedo and Pimenta, 2010	
<i>Ischnocnema epipeda</i> (Heyer, 1984)	E(T)
<i>Ischnocnema guentheri</i> (Steindachner, 1864)	
<i>Ischnocnema nasuta</i> (Lutz, 1925)	
<i>Ischnocnema oea</i> (Heyer, 1984)	
<i>Ischnocnema parva</i> (Girard, 1853)	
<i>Ischnocnema verrucosa</i> Reinhardt and Lütken, 1862	
CRAUGASTORIDAE	
<i>Haddadus binotatus</i> (Spix, 1824)	
STRABOMANTIDAE	
<i>Euparkerella robusta</i> Izecksohn, 1988	E(T)
<i>Euparkerella tridactyla</i> Izecksohn, 1988	E
HEMIPHRACTIDAE	
<i>Flectonotus fissilis</i> (Miranda-Ribeiro, 1920)	
<i>Flectonotus goeldii</i> (Boulenger, 1895)	
<i>Gastrotheca albolineata</i> (Lutz and Lutz, 1939)	
<i>Gastrotheca megacephala</i> Izecksohn, Carvalho-e-Silva and Peixoto, 2009	
HYLIDAE	
<i>Aparasphenodon bruno</i> i Miranda-Ribeiro, 1920	
<i>Aplastodiscus arildae</i> (Cruz and Peixoto, 1987)	
<i>Aplastodiscus cavicola</i> (Cruz and Peixoto, 1985)	
<i>Aplastodiscus weygoldti</i> (Cruz and Peixoto, 1987)	
<i>Bokermannohyla caramaschii</i> (Napoli, 2005)	
<i>Bokermannohyla ibitipoca</i> (Caramaschi and Feio, 1990)	
<i>Dendropsophus anceps</i> (Lutz, 1929)	
<i>Dendropsophus berthalutzae</i> (Bokermann, 1962)	
<i>Dendropsophus bipunctatus</i> (Spix, 1824)	
<i>Dendropsophus branneri</i> (Cochran, 1948)	
<i>Dendropsophus decipiens</i> (Lutz, 1925)	
<i>Dendropsophus elegans</i> (Wied-Neuwied, 1824)	
<i>Dendropsophus giesleri</i> (Mertens, 1950)	
<i>Dendropsophus haddadi</i> (Bastos and Pombal, 1996)	
<i>Dendropsophus microps</i> (Peters, 1872)	
<i>Dendropsophus minutus</i> (Peters, 1872)	
<i>Dendropsophus pseudomeridianus</i> (Cruz, Caramaschi and Dias, 2000)	
<i>Dendropsophus ruschii</i> (Weygoldt and Peixoto, 1987)	
<i>Dendropsophus seniculus</i> (Cope, 1868)	
<i>Hypsiboas albomarginatus</i> (Spix, 1824)	
<i>Hypsiboas albopunctatus</i> (Spix, 1824)	
<i>Hypsiboas crepitans</i> (Wied-Neuwied, 1824)	
<i>Hypsiboas faber</i> (Wied-Newied, 1821)	
<i>Hypsiboas pardalis</i> (Spix, 1824)	
<i>Hypsiboas polytaenius</i> (Cope, 1870)	
<i>Hypsiboas pombali</i> (Caramaschi, Pimenta and Feio, 2004)	

TABLE 2. CONTINUED.

TAXON	ENDEMISM
<i>Hypsiboas semilineatus</i> (Spix, 1824)	
<i>Itapotihyla langsdorffii</i> (Duméril and Bibron, 1841)	
<i>Phasmahyla exilis</i> (Cruz, 1980)	
<i>Phasmahyla guttata</i> (Lutz, 1924)	
<i>Phrynomedusa marginata</i> (Izecksohn and Cruz, 1976)	
<i>Phyllodytes kautskyi</i> Peixoto and Cruz, 1988	
<i>Phyllodytes luteolus</i> (Wied-Neuwied, 1824)	
<i>Phyllomedusa bahiana</i> Lutz, 1925	
<i>Phyllomedusa burmeisteri</i> Boulenger, 1882	
<i>Phyllomedusa rohdei</i> Mertens, 1926	
<i>Pseudis fusca</i> Garman, 1883	
<i>Scinax agilis</i> (Cruz and Peixoto, 1983)	
<i>Scinax alter</i> (Lutz, 1973)	
<i>Scinax arduous</i> Peixoto, 2002	E
<i>Scinax argyreornatus</i> (Miranda-Ribeiro, 1926)	
<i>Scinax belloni</i> Faivovich, Gasparini and Haddad, 2010	E(T)
<i>Scinax cuspidatus</i> (Lutz, 1925)	
<i>Scinax eurydice</i> (Bokermann, 1968)	
<i>Scinax fuscovarius</i> (Lutz, 1925)	
<i>Scinax hayii</i> (Barbour, 1909)	
<i>Scinax heyeri</i> (Peixoto and Weygoldt, 1986)	E
<i>Scinax humilis</i> (Lutz, 1954)	
<i>Scinax kautskyi</i> (Carvalho-e-Silva and Peixoto, 1991)	E
<i>Scinax similis</i> (Cochran, 1952)	
<i>Scinax v-signatus</i> (Lutz, 1968)	
<i>Scinax</i> cf. <i>x-signatus</i> (Spix, 1824)	
<i>Sphaenorhynchus botocudo</i> Caramaschi, Almeida and Gasparini 2009	
<i>Sphaenorhynchus mirim</i> Caramaschi, Almeida and Gasparini 2009	E(T)
<i>Sphaenorhynchus palustris</i> Bokermann, 1966	
<i>Sphaenorhynchus pauloalvini</i> Bokermann, 1973	
<i>Sphaenorhynchus planicola</i> (Lutz and Lutz, 1938)	
<i>Sphaenorhynchus prasinus</i> Bokermann, 1973	
<i>Trachycephalus mesophaeus</i> (Hensel, 1867)	
<i>Trachycephalus nigromaculatus</i> Tschudi, 1838	
CENTROLENIDAE	
<i>Vitreorana eurygnatha</i> (Lutz, 1925)	
<i>Vitreorana uranoscopa</i> (Müller, 1924)	
LEPTODACTYLIDAE	
<i>Leptodactylus cupreus</i> (Caramaschi, Feio and São Pedro, 2008)	
<i>Leptodactylus fuscus</i> (Schneider, 1799)	
<i>Leptodactylus latrans</i> (Steffen, 1815)	
<i>Leptodactylus natalensis</i> Lutz, 1830	
<i>Leptodactylus spixi</i> Heyer, 1983	
<i>Leptodactylus thomei</i> Almeida and Angulo, 2006	
CERATOPHRYIDAE	
<i>Ceratophrys aurita</i> (Raddi, 1823)	
CYCLORAMPHIDAE	
<i>Crossodactylodes bokermanni</i> Peixoto, 1983	E
<i>Crossodactylodes izecksohni</i> Peixoto, 1983	E(T)
<i>Cycloramphus bandeirensis</i> Heyer, 1983	

TABLE 2. CONTINUED.

TAXON	ENDEMISM
<i>Cycloramphus fuliginosus</i> Tschudi, 1838	
<i>Macrogenioglottus alipioi</i> Carvalho, 1946	
<i>Proceratophrys boiei</i> (Wied-Neuwied, 1824)	
<i>Proceratophrys laticeps</i> Izecksohn and Peixoto, 1981	
<i>Proceratophrys moehringi</i> Weygoldt and Peixoto, 1985	E
<i>Proceratophrys paviotii</i> Cruz, Prado and Izecksohn, 2005	E
<i>Proceratophrys phyllostoma</i> Izecksohn, Cruz and Peixoto, 1999	E
<i>Proceratophrys schirchi</i> (Miranda-Ribeiro, 1937)	
<i>Thoropa lutzi</i> Cochran, 1938	
<i>Thoropa miliaris</i> (Spix, 1824)	
<i>Thoropa petropolitana</i> (Wandolleck, 1907)	
<i>Zachaenus carvalhoi</i> Izecksohn, 1983	
LEIUPERIDAE	
<i>Physalaemus aguirrei</i> Bokermann, 1966	
<i>Physalaemus crombiei</i> Heyer and Wolf, 1989	
<i>Physalemus cuvieri</i> Fitzinger, 1826	
<i>Physalemus marmoratus</i> (Reinhardt and Lütken 1862)	
<i>Physalemus maculiventris</i> (Lutz, 1925)	
<i>Physalemus obtectus</i> Bokermann, 1966	
<i>Physalaemus olfersii</i> (Lichtenstein and Martens, 1856)	
<i>Physalaemus signifer</i> (Girard, 1853)	
<i>Pseudopaludicola</i> aff. <i>falcipes</i> (Hensel, 1867)	
BUFONIDAE	
<i>Dendrophryniscus carvalhoi</i> Izecksohn, 1994	E(T)
<i>Melanophryniscus</i> sp. nov.	
<i>Rhinella crucifer</i> (Wied-Neuwied, 1821)	
<i>Rhinella granulosa</i> (Spix, 1824)	
<i>Rhinella hoogmoedi</i> (Caramaschi and Pombal, 2006)	
<i>Rhinella pygmaea</i> (Myers and Carvalho, 1952)	
<i>Rhinella schneideri</i> (Werner, 1894)	
HYLODIDAE	
<i>Crossodactylus</i> sp. nov. 1	
<i>Crossodactylus</i> sp. nov. 2	
<i>Hylodes babax</i> Heyer, 1982	
<i>Hylodes lateristrigatus</i> (Baumann, 1912)	
<i>Megaelosia apuana</i> Pombal, Prado and Canedo, 2003	
AROMOBATIDAE	
<i>Allobates capixaba</i> (Bokermann, 1967)	
MICROHYLIDAE	
<i>Arcovomer passarellii</i> Carvalho, 1954	
<i>Chiasmocleis capixaba</i> Cruz, Caramaschi and Izecksohn, 1997	
<i>Chiasmocleis carvalhoi</i> Cruz, Caramaschi and Izecksohn, 1997	
<i>Chiasmocleis schubarti</i> Bokermann, 1952	
<i>Dasypops schirchi</i> Miranda-Ribeiro, 1924	
<i>Dermatonotus muelleri</i> (Boettger, 1885)	
<i>Elachistocleis cesarii</i> (Schneider, 1799)	
<i>Myersiella microps</i> (Dumeril and Bibron, 1841)	
<i>Stereocyclops incrassatus</i> Cope, 1870	
RANIDAE	
<i>Lithobates catesbeianus</i> (Shaw, 1802)	

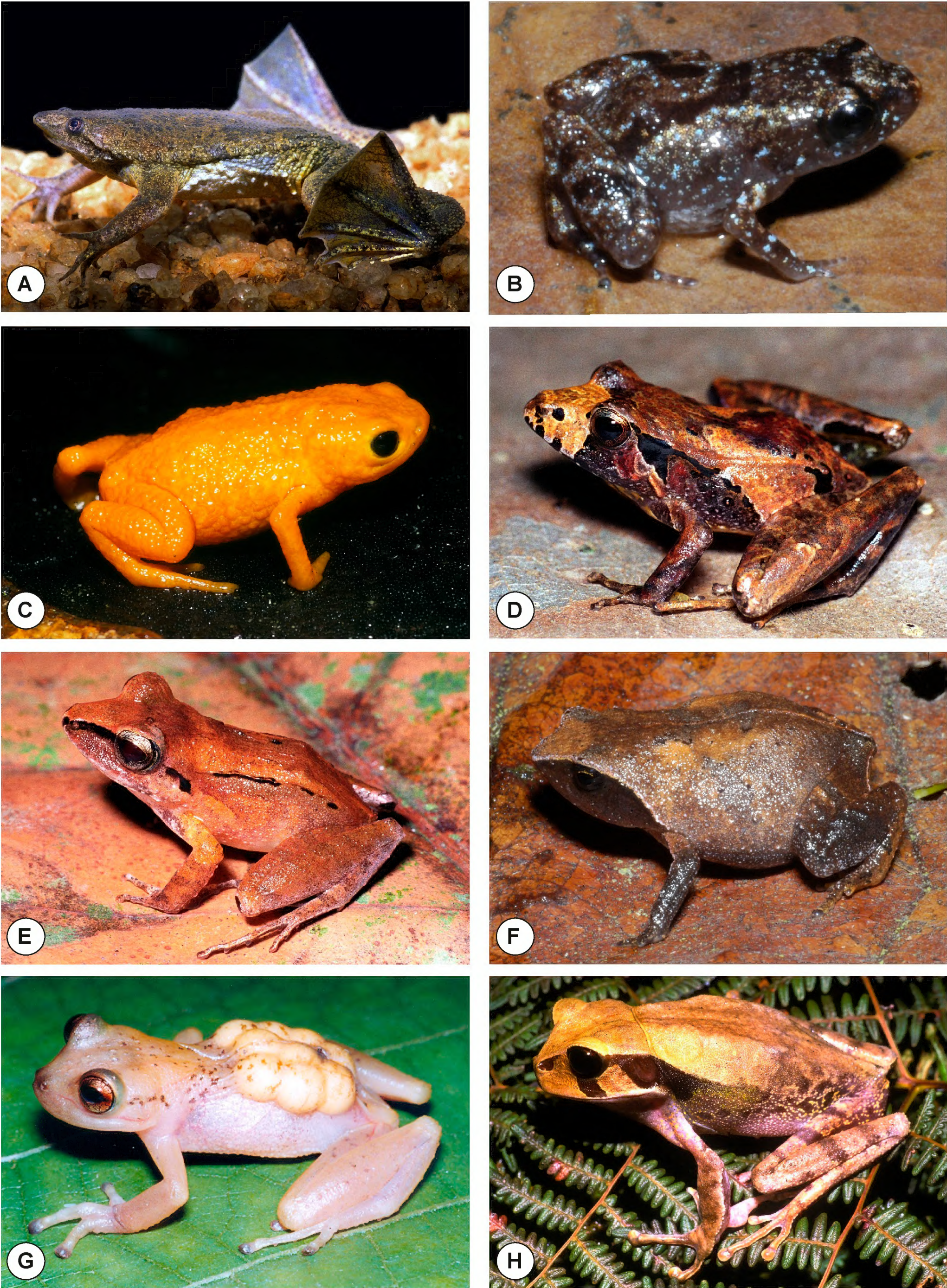


FIGURE 2. Some amphibian species found in the State of Espírito Santo: A, *Pipa carvalhoi*; B, *Adelophryne* cf. *pachydactyla*; C, *Brachycephalus alipioi*; D, *Ischnocnema oea*; E, *Haddadus binotatus*; F, *Euparkerella tridactyla*; G, *Flectonotus fissilis*; H, *Gastrotheca megacephala*.



FIGURE 3. Some amphibian species found in the State of Espírito Santo: A, *Aparasphenodon brunoi*; B, *Aplastodiscus weygoldti*; C, *Bokermannohyla caramaschi*; D, *Dendropsophus ruschii*; E, *Hypsiboas polytaenius*; F, *Itapotihyla langsdorffii*; G, *Phasmahyla exilis*; H, *Phrynomedusa marginata*.

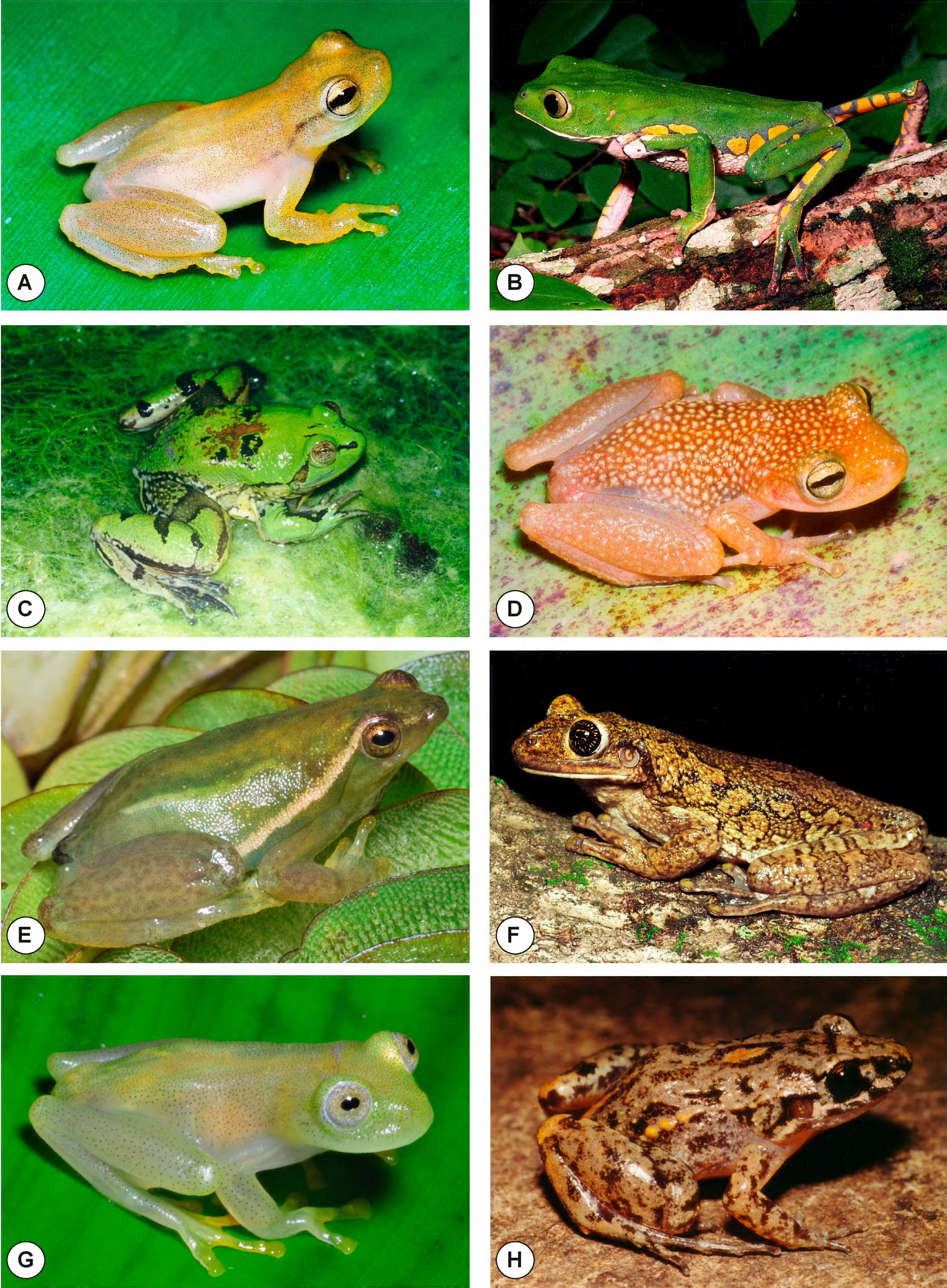


FIGURE 4. Some amphibian species found in the State of Espírito Santo: A, *Phyllodytes luteolus*; B, *Phyllomedusa burmeisteri*; C, *Pseudis fusca*; D, *Scinax belloni*; E, *Sphaenorhynchus botocudo*; F, *Trachycephalus nigromaculatus*; G, *Vitreorana eurygnatha*; H, *Leptodactylus thomei*.



FIGURE 5. Some amphibian species found in the State of Espírito Santo: A, *Ceratophrys aurita*; B, *Crossodactylodes bokermanni*; C, *Cycloramphus fuliginosus*; D, *Macrogenioglottus alipioi*; E, *Proceratophrys laticeps*; F, *Thoropa lutzi*; G, *Zachaeus carvalhoi*; H, *Physalaemus crombiei*.



FIGURE 6. Some amphibian species found in the State of Espírito Santo: A, *Pseudopaludicola* aff. *falcipes*; B, *Dendrophryniscus carvalhoi*; C, *Melanophryniscus* sp. nov.; D, *Rhinella schneideri*; E, *Crossodactylus* aff. *gaudichaudii*; F, *Hylodes lateristrigatus*; G, *Megaelosia apuana*; H, *Allobates capixaba*.

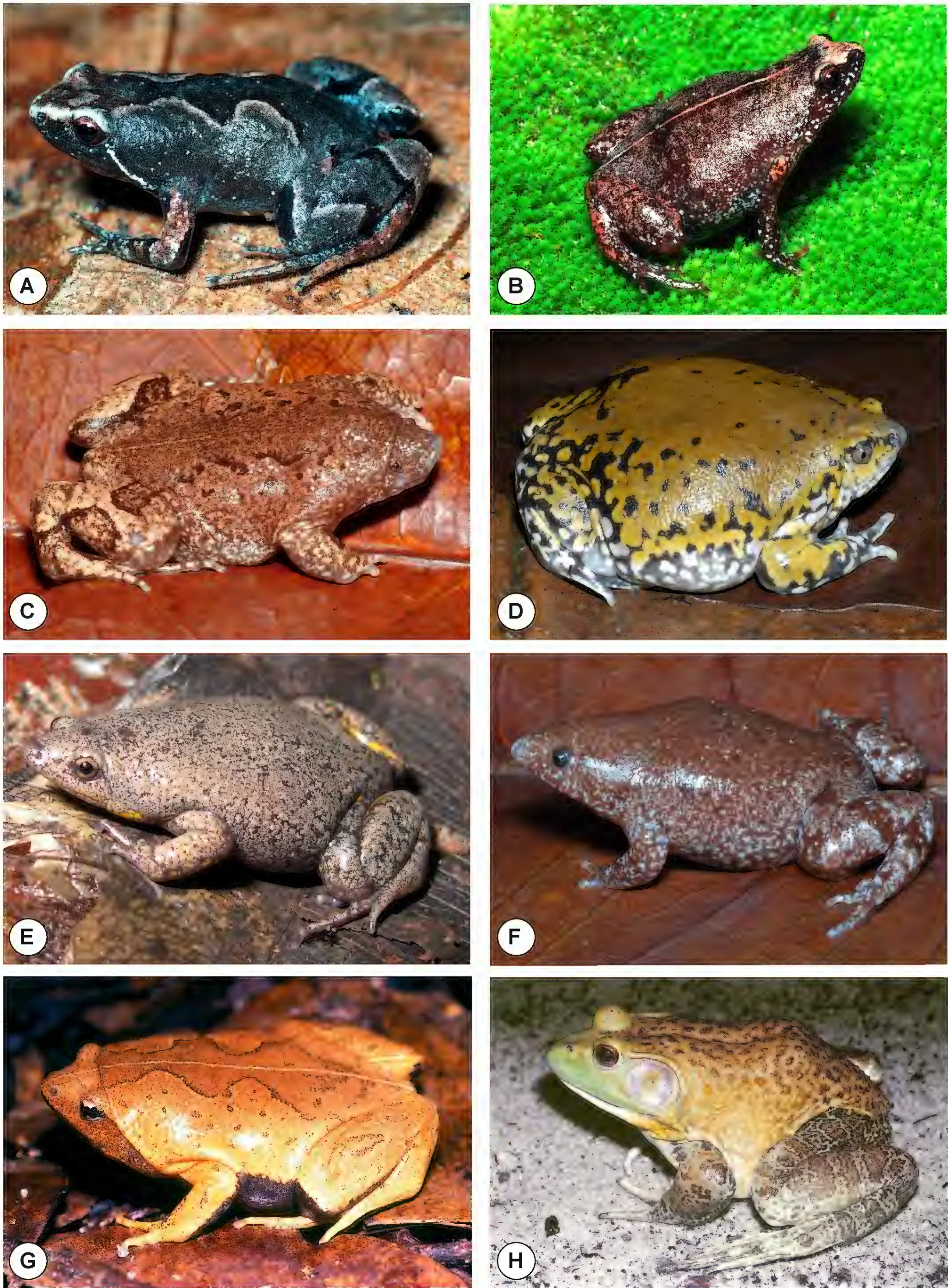


FIGURE 7. Some amphibian species found in the State of Espírito Santo: A, *Arcovomer passarelli*; B, *Chiasmocleis capixaba*; C, *Dasypops schirchi*; D, *Dermatonotus muelleri*; E, *Elachistocleis cesarii*; F, *Myersiella microps*; G, *Stereocyclops incrassatus*; H, the invasive *Lithobates catesbeianus*.

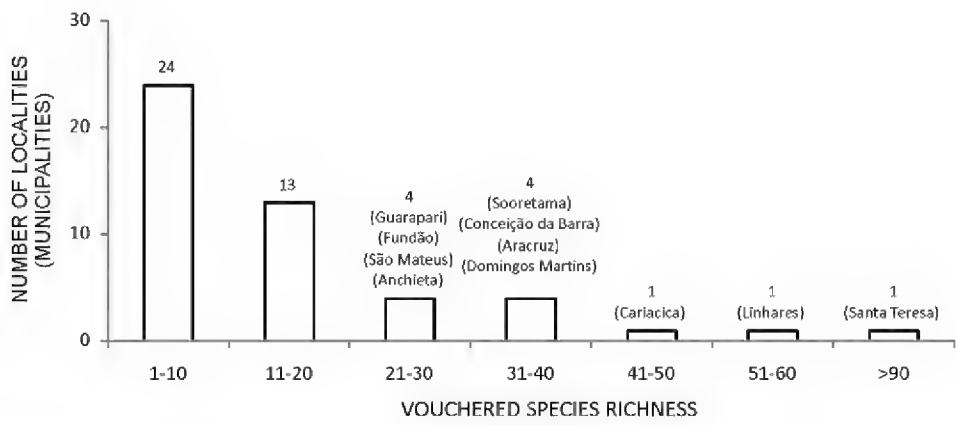


FIGURE 8. Number of municipalities in the different classes of vouchered richness.

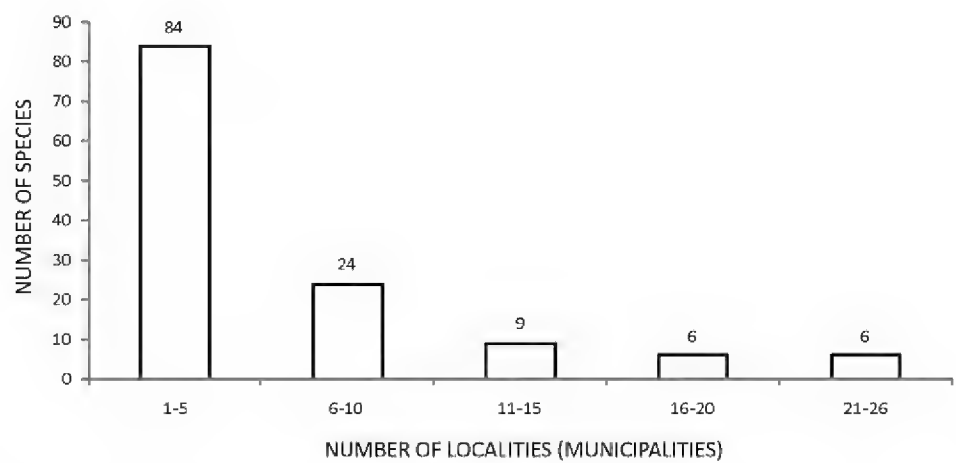


FIGURE 9. Number of species in the different classes of vouchered distribution range.

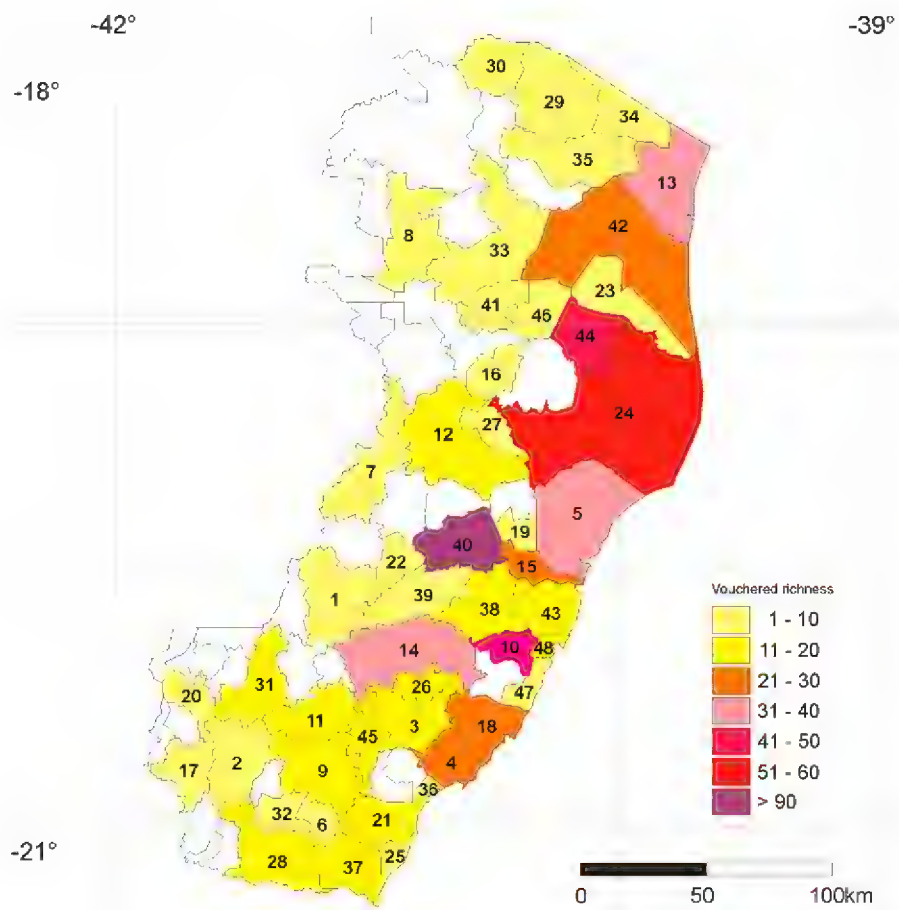


FIGURE 10. Vouchered richness in different municipalities of the state of Espírito Santo. Names of the municipalities as in figure 1.

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- Aplastodiscus arildae* (Domingos Martins: CFBH 10842; Vargem Alta: CFBH 25547).
- Aplastodiscus cavicola* (Cariacica: MNRJ 28412; Santa Teresa: EI 7341 - Holotype; Vargem Alta: CFBH 25543-25546).
- Aplastodiscus weygoldti* (Cariacica: MBML 6345; Santa Teresa: EI 7697 - Holotype; Vargem Alta: MBML 0049).
- Arcovomer passarelli* (Anchieta: MBML 3573; Aracruz: CFBH 2181-83; Linhares: MNRJ 22834; Sooretama: MNRJ 35022-35023).
- Bokermannohyla caramaschii* (Cachoeiro de Itapemirim: MBML 0545; Cariacica: CFBH 22497; Domingos Martins: MBML 1776, 1778; Fundão: MBML 2123, MNRJ 29975; Ibitirama: MBML 6368; Marechal Floriano: MBML 5816-5818; Santa Maria de Jetibá: MBML 5696; Santa Teresa: MNRJ 23701 - Holotype).
- Bokermannohyla ibitipoca* (Domingos Martins: MZUFV 5220-21).
- Brachycephalus alipioi* (Domingos Martins: MNRJ 25386; Santa Teresa: MNRJ 25405-25407; Vargem Alta: MNRJ 26042 - Holotype; CFBH 3566-3567).
- Ceratophrys aurita* (Linhares: MBML 5504, MNRJ 30477, ZUEC 3623; Santa Teresa: MBML 0591; São Mateus: MBML 5503; Sooretama: MNRJ 2874).
- Chiasmocleis capixaba* (Aracruz: MNRJ 17514 - Holotype; Cariacica: MNRJ 27896-27904; Conceição da Barra: MBML 5609; Linhares: CFBH 5972-5975).
- Chiasmocleis carvalhoi* (Guarapari: ZUFRJ 9894-9899).
- Chiasmocleis schubarti* (Anchieta: MBML 3458-3459; Aracruz: CFBH 2703-04; Cariacica: MNRJ 27894-27895; Conceição da Barra: MBML 4993; Linhares: MBML 3450-3452; Sooretama: MZUSP 2309 - Holotype).
- Crossodactylodes bokermanni* (Castelo: MBML 0016; Domingos Martins: MBML 1779-1780; Santa Teresa: EI 7173 - Holotype).
- Crossodactylodes izecksohni* (Santa Teresa: EI 7192 - Holotype).
- Crossodactylus* aff. *gaudichaudii* (Cachoeiro do Itapemirim: CFBH 4074; Cariacica: MBML 6393; Mimoso do Sul: CFBH 25536-25537; Santa Teresa: CFBH 4418).
- Crossodactylus* aff. *dispar* (Cachoeiro do Itapemirim: MBML 570; Santa Teresa: MBML 382).
- Cycloramphus bandeirensis* (Ibitirama: MZUSP 52924 - Holotype).
- Cycloramphus fuliginosus* (Santa Teresa: MNRJ 1317).
- Dasylops schirchi* (Aracruz: CFBH 5982-83; Colatina: MNRJ 542 - Holotype; Linhares: CFBH 22939-40; Sooretama: CFBH 250).
- Dendrophryniscus carvalhoi*: (Santa Teresa: EI 4127 - Holotype, MBML 0847).
- Dendropsophus anceps* (Aracruz: MBML 1188; Cachoeiro de Itapemirim: MBML 1716, 1832; Conceição da Barra: MBML 0070; Governador Lindenberg: CFBH 23067-23069; Linhares: CFBH 5795-5800; Nova Venécia: MBML 2630-2632; Sooretama: MBML 3228-3229).
- Dendropsophus berthaltutzae* (Cariacica: MNRJ 31389; Santa Teresa: MBML 50-52, MBML 66-68).
- Dendropsophus bipunctatus* (Anchieta: MBML 1512-16; Aracruz: CFBH 2691-92; Cachoeiro de Itapemirim: MBML 1712,1720; Cariacica: MNRJ 27833; Conceição da Barra: CFBH 2378-80; Governador Lindenberg: CFBH 23070-74; Guarapari: CFBH 9703-06; Itapemirim: MBML 5164; Linhares: MBML 2405-07; Marataízes: MBML 6311; Mucurici: MNRJ [Field Number APA M 189]; Santa Leopoldina: MBML 4099-4100; Santa Teresa: MNRJ 30454; São Mateus: CFBH 1614-15; Sooretama: MBML 3230; Vitória: MBML 6560-61).
- Dendropsophus branneri* (Anchieta: MBML 1864-1868; Aracruz: CFBH 2153-2154; Cachoeiro de Itapemirim: MBML 1719, 1729; Cariacica: CFBH 1583-1585; Conceição da Barra: MNRJ 30039-30040, MBML 1318; Guarapari: MBML 5313; Itapemirim: MBML 5333-5334; Itarana: MBML 4294-4298; Linhares: MBML 5328-5332; Marechal Floriano: MNRJ 38956; Marilândia: MBML 2651; Santa Teresa: MBML 467-469; São Mateus: CFBH 1620-1621; Serra: MBML 5532; Vitória: MBML 2108).
- Dendropsophus decipiens* (Cariacica: MNRJ 39429-39431; Domingos Martins: MNRJ 39898-39899; Linhares: MNRJ 1450; Marechal Floriano: MNRJ 38948; Presidente Kennedy: MNRJ 42287-42288; Santa Teresa: MNRJ 40623,40632).
- Dendropsophus elegans* (Anchieta: MBML 1508-1510; Aracruz: CFBH 5364; Baixo Guandu: MNRJ 31305; Cachoeiro de Itapemirim: CFBH 4076; Cariacica: MBML 5124-5128; Castelo: MBML 1599; Conceição da Barra: MBML 5606; Domingos Martins: CFBH 11081-11082; Fundão: MBML 2099-2100; Governador Lindenberg: CFBH 23114-23115; Guarapari: MNRJ 32860; Itapemirim: MBML 5132; Itarana: MBML 4299-4300; Linhares: MBML 2428-2431; Marechal Floriano: MBML 5831; Mimoso do Sul: CFBH 11086; Mucurici: MNRJ [Field number APA 0213]; Muniz Freire: CFBH 4109; Nova Venécia: MBML 2614-2616; Pedro Canário: MBML 885; Santa Leopoldina: CFBH 1348-49; Santa Teresa: MBML 1116; São Mateus: CFBH 1516;

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APPENDIX 1. Voucher specimens.

Adelophryne cf. *pachydactyla* (Santa Teresa: MNRJ 28344).
Allobates capixaba (Baixo Guandu: MZUSP 35674; Linhares: MZUSP 93871; Santa Teresa: EI 10964-10966; Sooretama: MZUSP 73752 - Holotype).
*Aparasphenodon bruno*i (Aracruz: MBML 923, 1189; Conceição da Barra: MBML 1313, 5603; Guarapari: CFBH 580, 1359; Itapemirim: MBML

Sooretama: MBML 3231-33; Vitória: MBML 4433).

Dendropsophus giesleri (Conceição da Barra: MBML 445-455; Linhares: CFBH 5894-5897; MBML 5024-5025; Santa Teresa: MNRJ 28379-28391; Sooretama: MBML 3328-3329).

Dendropsophus haddadi (Aracruz: MNRJ 17748; Conceição da Barra: MNRJ 17325 - Holotype; Guarapari: MBML 4956,4982; Linhares: MNRJ 17078-17 - Paratypes; Santa Teresa: CFBH 2595 - Paratype; São Mateus: MNRJ 18431-18436; Vitória: MBML 7177-7180).

Dendropsophus microps (Cariacica: MNRJ 27908-27909; Santa Teresa: MNRJ 30445-30447).

Dendropsophus minutus (Alegre: CFBH [Field number JLG A073]; Alfredo Chaves: MBML 6298-6299; Anchieta: MBML 818; Cariacica: MBML 6493; Conceição da Barra: MNRJ 30042; Domingos Martins: MBML 6632-6634; Fundão: MBML 2102, 2106, MNRJ 31286-31287; Ibitirama: MBML 6367; Linhares: ZUEC 8603-8605; Marechal Floriano: MBML 4456; Montanha: MBML 4277; Mucurici: CFBH 26346; Nova Venécia: MBML 2634; Pedro Canário: MBML 916-917; Santa Teresa: MBML 710; São Mateus: CFBH 1521-1522; Sooretama: MNRJ 3848; Vargem Alta: MNRJ 26036).

Dendropsophus pseudomeridianus (Mimoso do Sul: ZUF RJ 0224; Presidente Kennedy: MNRJ 42357-42362).

Dendropsophus ruschii (Domingos Martins: EI 7741 - Holotype; CFBH 10852-10854; Santa Teresa: MZUSP 63322-63323).

Dendropsophus seniculus (Aracruz: CFBH 4027; Cariacica: MNRJ 27910-27912; Colatina: MNRJ 824; Conceição da Barra: MBML 4992; Domingos Martins: MBML 6628-6631; Linhares: CFBH 5988-5991; Santa Teresa: MNRJ 1304; São Mateus: 1622-1623; Sooretama: MBML 3238-3239; Vargem Alta: CFBH [Field number JLG V0172]).

Dermatonotus mulleri (Mucurici: CFBH [Field number JLG M321]).

Elachistocleis cesarii (Alegre: MBML 7028-7030).

Euparkerella robusta (Mimoso do Sul: EI 7283).

Euparkerella tridactyla (Alfredo Chaves: MBML 6720; Cariacica: CFBH 948-950; Fundão: MBML 0853; Santa Maria de Jetibá: MBML 5699; Santa Teresa: EI 7257 - Holotype, MNRJ 4172-4173).

Flectonotus fissilis (Santa Teresa: ZUEC 6567-G).

Flectonotus goeldi (Santa Teresa: MBML 500).

Gastrotheca albolineata (Santa Teresa: MBML 47).

Gastrotheca megacephala (Guarapari: ZUF RJ 7223 - Holotype; Linhares: MBML 1324; Sooretama: MNRJ 4061; Vila Velha: ZUEC 3721-3723).

Haddadus binotatus (Alegre: MBML 7194; Alfredo Chaves: MBML 6288-6290; Anchieta: MBML 3457; Aracruz: MBML 37-43; Cachoeiro de Itapemirim: MBML 268-271; Cariacica: CFBH 940-941; Castelo: MBML 30-31; Colatina: MNRJ 781; Conceição da Barra: MBML 557-60; Domingos Martins: MBML 4952; Fundão: MBML 2098, 2101; Guarapari: MBML 4802-4804; Guaçuí: MNRJ 30863-64; Linhares: MBML 3234; Mimoso do Sul: CFBH 25524-25528; Montanha: MBML 4270-4275; Muniz Freire: CFBH 4059; Pedro Canário: MBML 34; Santa Leopoldina: MBML 3586; Santa Maria de Jetibá: MBML 5712-5713; Santa Teresa: MBML 474-475, MNRJ 30475, 30743; São Mateus: CFBH 1618-1619; Sooretama: MNRJ 3945; Vargem Alta: MNRJ 26038-26041);

Hylodes lateristrigatus (Cariacica: MBML 5367; Santa Teresa: MBML 7223-7226).

Hypsiboas albomarginatus (Alfredo Chaves: MBML 6303; Anchieta: MBML 6474-6476; Aracruz: CFBH 3026; Cariacica: CFBH 887, MBML 4814; Domingos Martins: MNRJ 34137; Fundão: MBML 5669; Governador Lindenberg: CFBH 26443-26446; Guarapari: MBML 5560-5561; Linhares: MBML 2390-2391; Marechal Floriano: MBML 4818; Marilândia: MBML 2626; Mimoso do Sul: CFBH 11143-11145; Muniz Freire: CFBH 4060; Presidente Kennedy: MBML 4677-4679; Santa Leopoldina: MBML 4812; Santa Teresa: MBML 0054; São Gabriel da Palha: MBML 4813; Vila Velha: MBML 6428; Vitória: MBML 7163-7165).

Hypsiboas albopunctatus (Cariacica: MBML 5149; Castelo: MBML 1630; Fundão: MBML 5555; Ibitirama: MBML 6372; Marechal Floriano: MBML 5147-5148; Marilândia: MBML 2565; Mimoso do Sul: CFBH 11330-11331; Muniz Freire: CFBH 4057; Santa Leopoldina: MBML 5145-5146; Santa Teresa: MBML 0203).

Hypsiboas crepitans (Alegre: MBML 5179-5180; Baixo Guandu: MNRJ 34738; Barra de São Francisco: MBML 1844; Colatina: MBML 2081-2083; Fundão: MBML 2123; Governador Lindenberg: CFBH 26447-26448; Linhares: CFBH 26390-26391; Marechal Floriano: MNRJ 38951; Muniz Freire: MBML 1768; Santa Teresa: MBML 2873-2874).

Hypsiboas faber (Alfredo Chaves: MBML 6304; Anchieta: MBML 1250; Aracruz: MBML 6586-6587; Baixo Guandu: MBML 0400-02; Cachoeiro de Itapemirim: MBML 458-461; Cariacica: MBML 5216-5369; Castelo: MBML 1600; Conceição da Barra: CFBH 2431-2433; Domingos Martins: MBML 6532-6534; Fundão: MBML 1263-1264; Jaguaré: MBML 0284; Linhares: MBML 0058; Marechal Floriano: MBML 5159-5160; Mimoso do Sul: CFBH 11123; Presidente Kennedy: MBML 4671; Santa Maria de Jetibá: MBML 5697; Santa Teresa: MBML 701, 781; Sooretama: MBML 3236; Vargem Alta: CFBH 25585, MBML 0516-17).

Hypsiboas pardalis (Alfredo Chaves: MBML 6300; Cariacica: MBML 5513; Castelo: MBML 1617; Colatina: MBML 2081; Domingos Martins: MBML 6625; Fundão: MBML 4912-4913; Guaçuí: MNRJ 30866; Linhares: CFBH 26392; Marechal Floriano: CFBH 1470-1471; Muniz Freire: MNRJ 26077-26079; Santa Leopoldina: MBML 0242; Santa Teresa: MBML 0060; Vargem alta: CFBH 26537).

Hypsiboas polytaenius (Domingos Martins: MBML 6320-6321; Marechal Floriano: MBML 4450; Mimoso do Sul: CFBH 24461; Santa Teresa: MZUSP 52764-6, USNM 7014, USNM 7015, USNM 7020; Vargem Alta: CFBH 0000).

Hypsiboas pombali (Linhares: MNRJ 16773-16774 - Paratypes; Sooretama: MNRJ 35001-35003 - Paratypes).

Hypsiboas semilineatus (Afonso Cláudio: MNRJ 14390; Alfredo Chaves: MBML 6730-6732; Anchieta: MBML 0800; Aracruz: MBML 5970-5972; Cachoeiro de Itapemirim: CFBH 4071; Cariacica: CFBH 884-886, MBML 5237-5239; Castelo: MBML 1537-1539; Conceição da Barra: CFBH 1930-1932; Domingos Martins: CFBH 11248-11249; Fundão: MBML 1257; Guarapari: MBML 5222-5224; Itapemirim: MBML 217; Linhares: CFBH 9969, MBML 5225; Marataízes: MNRJ 35024; Marechal Floriano: MBML 4455; Mimoso do Sul: CFBH 11090-11092; Mucurici: MBML 0908; Santa Leopoldina: MBML 5226; Santa Teresa: CFBH 11250-11251; São Mateus: CFBH 1519; Sooretama: MNRJ 1996).

Ischnocnema abdita. (Cariacica: CFBH 22521-22522; Mimoso do Sul: CFBH 22296-22298; Santa Maria de Jetibá: MBML 7229-7230. Santa Teresa: MNRJ 34908 - Holotype; Vargem Alta: CFBH 25050).

Ischnocnema epipeda (Santa Teresa: MZUSP 59633 - Holotype; MZUSP 59634-39, EI 7294-7302, MNRJ 1874).

Ischnocnema guentheri (Domingos Martins: CFBH 4078, 4083; Marechal Floriano: MBML 5246-5247; Santa Teresa: EI 7324-25, MNRJ 34914; Vargem Alta: CFBH 26528).

Ischnocnema nasuta (Cachoeiro de Itapemirim: MBML 519-521; Santa Teresa: EI 7303, EI 7317).

Ischnocnema oea (Alfredo Chaves: MBML 7190,7201; Cariacica: CFBH 22517-22519; Santa Teresa: MNRJ 1244 - Holotype, CFBH 10876-10877).

Ischnocnema parva (Santa Teresa: MBML 4118).

Ischnocnema verrucosa (Alfredo Chaves: MBML 7010-7012; Aracruz: MBML 919, CFBH 4492-4493; Cariacica: CFBH 2272-2273; Fundão: MBML 5541; Santa Maria de Jetibá: MBML 5686; Santa Teresa: MNRJ 30911-30912).

Itapotihyla langsdorffii (Conceição da Barra: CFBH 4158, MBML 4959; Linhares: MBML 2375-2376; Santa Teresa: CFBH 4178).

Leptodactylus cupreus (Barra de São Francisco: MBML 1147-1149; Cariacica: CFBH 23632; Linhares: CFBH 26359-26360, MNRJ 35004; Santa Teresa: MBML 6844-6847).

Leptodactylus fuscus (Anchieta: MBML 6971; Aracruz: CFBH 4181-4182, MBML 0831-0833; Barra de São Francisco: MBML 2571,2575; Colatina: MNRJ 1416; Conceição da Barra: MBML 5600; Fundão: MBML 1265; Governador Lindenberg: CFBH 9672-9680; Guarapari: MNRJ 32367-32368; Itapemirim: MBML 6695; Linhares: MBML 1662-1663; Presidente Kennedy: MBML 6165-6166; Santa Teresa: MBML 87-90; São Mateus: CFBH 1605,1964; Serra: MNRJ 1759; Vitória: MBML 7150-7162).

Leptodactylus latrans (Alfredo Chaves: MBML 6295-6296; Anchieta: MBML 1241-1242; Aracruz: MBML 5635; Cachoeiro de Itapemirim: CFBH 4073; Cariacica: MBML 5961; Colatina: MBML 2078; Conceição da Barra: CFBH 2392-2393; Domingos Martins: MNRJ 26408-26411; Fundão: MBML 5381; Guarapari: MBML 1787; Itapemirim: MBML 5958-5960; Linhares: CFBH 955-956; Marechal Floriano: MBML 4454; Mimoso do Sul: CFBH 11321-11323; Presidente Kennedy: MBML 6176; Santa Teresa: MBML 0689,2077; São Mateus: CFBH 1690-1691; Serra: MBML 5379-5380; Sooretama: MBML 3573; Vila Velha: MBML 4926; Vitória: CFBH 1993-1997).

Leptodactylus natalensis (Anchieta: MBML 6230-6235; Aracruz: MBML 86; Cariacica: MNRJ 27929-27930; Guarapari: CFBH 4111; Linhares: MBML 0085, MNRJ 4913-4917; Santa Teresa: MBML 3909-3910; Sooretama: MBML 3936-3938).

Leptodactylus spixi (Anchieta: MBML 7212-7213; Cachoeiro de Itapemirim: MNRJ 18367-18368; Domingos Martins: CFBH 11324-11325; Linhares: MBML 2381-2382; Muniz Freire: MNRJ 26060-26063; Santa Teresa: MBML 0839).

Leptodactylus thomei (Linhares: MBML 2521 - Holotype; Mimoso do Sul: CFBH 22295).

Lithobates catesbeianus (Itarana: MBML 5587).

Macrogenioglottus alipioi (Linhares: MBML 1823-1824, ZUEC 12047; Santa Teresa: MBML 93-95).

Megaelosia apuana (Domingos Martins: MNRJ 26057 - Holotype; Santa Teresa: MZUSP 27717).

Melanophryniscus sp. nov. (Guarapari: CFBH 15727-45).

Myersiella microps (Marechal Floriano: CFBH 4173; Santa Teresa: MNRJ

34583; Sooretama: CFBH [Field number APA S237]).

Phasmahyla exilis (Cariacica: MNRJ 24633; Santa Teresa: EI 5584 - Holotype).

Phasmahyla guttata (Atílio Vivaqua: MNRJ 59875).

Phrynomedusa marginata (Santa Teresa: EI 5177 - Holotype).

Phyllodytes kautskyi (Domingos Martins: EI 7728 - Holotype; MBML 2570).

Phyllodytes luteolus (Conceição da Barra: CFBH 4163-4164; Fundão: MBML 5303-5304; Guarapari: CFBH 890-895; Itapemirim: MBML 5291-5292; Linhares: MBML 5288-5290; São Mateus: MBML 1679, 1802; Santa Teresa: MNRJ 23298-23300; Vila Velha: MBML 5018; Vitória: CFBH 5386-5387).

Phyllomedusa bahiana (Aracruz: CFBH 5378-5380; Linhares: EI 7426).

Phyllomedusa burmeisteri (Alegre: MBML 5305-07; Aracruz: CFBH 2261-63; CFBH 1949; Cariacica: MNRJ 32316-17; Colatina: ZUEC 1506; Conceição da Barra: CFBH 2423; Guarapari: MBML 5027; Jaguaré: MNRJ 3069; Linhares: CFBH 11080; Marilândia: MBML 2569; Muniz Freire: MNRJ 26024-26027; Santa Teresa: MBML 5963; São Mateus: CFBH 1960; Sooretama: MBML 3225-27).

Phyllomedusa rohdei (Alfredo Chaves: MBML 6986-88; Cachoeiro de Itapemirim: MBML 643; Domingos Martins: CFBH 10846; Linhares: CFBH 23027-29; Marechal Floriano: MBML 5891; Nova Venécia: MBML 2540-2545; Santa Teresa: MBML 5311-12; Vargem Alta: MBML 0643).

Physalaemus aguirrei (Anchieta: MBML 809-810; Aracruz: CFBH 4028; Conceição da Barra: CFBH 4152-4153; Jaguaré: MBML 4082; Linhares: MBML 2328-2329; São Mateus: CFBH 1527-1528; Sooretama: WCAB 19303 - Holotype).

Physalaemus crombiei (Alfredo Chaves: MBML 7020-7023; Anchieta: MBML 1938-1941; Aracruz: CFBH 2156-2160; Cachoeiro de Itapemirim: CFBH 4072; Cariacica: MNRJ 27920-27925; Castelo: MBML 0167; Conceição da Barra: MBML 355-365; Fundão: MBML 2097; Linhares: MBML 2340-2350; Santa Teresa: MZUSP 66252 - Holotype).

Physalemus cuvieri (Alfredo Chaves: MBML 6740-6741; Castelo: MBML 1629; Fundão: MBML 2124; Marechal Floriano: MBML 4457; Santa Teresa: MBML 3989,4115).

Physalemus maculiventris (Santa Teresa: CFBH 10813-10814).

Physalemus marmoratus (Piúma: MNRJ 40878-40879).

Physalemus obtectus (Alfredo Chaves: MBML 7026; Anchieta: MBML 6770-6771; Cariacica: MBML 3320-3322; Guarapari: MBML 6149-6150; Guaçuí: MNRJ 30867-30868; Sooretama: WCAB 20498 - Holotype).

Physalaemus olfersii (Santa Teresa: MZUSP 53561-53564).

Physalaemus signifer (Alfredo Chaves: MBML 6736-6739; Linhares: MNRJ 35019-35021).

Pipa carvalhoi (Baixo Guandu: MBML 310-311; Santa Teresa: MNRJ 3332, MBML 144-145; Serra: CFBH 11861-11863).

Proceratophrys boiei (Castelo: MBML 0143; Domingos Martins: CFBH 10870-10871; Mimoso do Sul: CFBH 25532-25535; Muniz Freire: CFBH 4058; Santa Maria de Jetibá: MBML 5701; Santa Teresa: MBML 142; Vargem Alta: MNRJ 26032-26033).

Proceratophrys laticeps (Aracruz: CFBH 4172,4185; Cariacica: CFBH 2280-2282; Conceição da Barra: MBML 132-141; Guarapari: MZUSP 135135; Linhares: EI 5887 - Holotype, MBML 5625; Santa Teresa: CFBH 2730-2731; São Mateus: MBML 3884; Sooretama: ZUEC 9481).

Proceratophrys moehringi (Castelo: CFBH 9671; Domingos Martins: ZUFRJ 6198; Santa Teresa: MZUSP 59685 - Holotype).

Proceratophrys paviotii (Aracruz: MNRJ 40182-40184; Baixo Guandu: MZUSP 34649-34653; Marilândia: MBML 2556; Santa Leopoldina (Porto Cachoeira): MZUSP 00161; Santa Maria de Jetibá: MBML 5702-5704; Santa Teresa: MNRJ 34936 - Holotype).

Proceratophrys phyllostoma (Vargem Alta: MBML 1151 - Holotype; Santa Teresa: MBML 1326).

Proceratophrys schirchi (Cariacica: CFBH 5533-5534; Colatina: MNRJ 121; Domingos Martins: MBML 1106; Marilândia: MBML 2550-2551; Santa Leopoldina: MBML 1335; Santa Teresa: MBML 1848-1849; Serra: MBML 5482).

Pseudis fusca (Conceição da Barra: CFBH 2428-2430; Linhares: MBML 1655-1657; Nova Venécia: MBML 2557-2558; São Mateus: CFBH 1983-1985; Sooretama: MNRJ 2692).

Pseudopaludicola aff. *falcipes* (Guarapari: CFBH 9967-68; Mucurici: CFBH 26347; Presidente Kennedy: MNRJ 25329-25331; Serra: CFBH 10820-30).

Rhinella crucifer (Alegre: MBML 1636-1638; Alfredo Chaves: MBML 6297; Anchieta: MBML 6357; Aracruz: CFBH 2863-2865; Baixo Guandu: MNRJ 21929-21930; Cachoeiro do Itapemirim: MBML 0587; Cariacica: MBML 5031-5033; Colatina: MNRJ 352-353; Conceição da Barra: MBML 4836; Domingos Martins: MBML 1775; Fundão: MBML 2086; Guaçuí: MNRJ 30859; Guarapari: MBML 5051; Itapemirim: MBML 5039-5040; Linhares: CFBH 958-959; Marechal Floriano: MBML 4452; Mimoso do Sul: CFBH 25485-25487; Muniz Freire: MNRJ 26074; Piúma: MNRJ 22340; Santa Maria de Jetibá: MBML 5698; Santa Teresa: CFBH 4177, MBML 0008; Serra: MBML 4838; Sooretama: MZUSP 4017; Vargem Alta: CFBH 25051-25052; Vila Velha: CFBH 2875-2876; Vitória: MBML 1773).

Rhinella granulosa (Anchieta: MBML 3673; Aracruz: CFBH 3402; Barra de São Francisco: MBML 1144-1145; Cariacica: MBML 4953; Colatina: MBML 2080; Conceição da Barra: CFBH 2455-2457; Fundão: MBML 1256; Ibiraçu: MBML 6718; Linhares: CFBH 1028-1029, MBML 2379-2380; Nova Venécia: MBML 2627-2628; Pinheiros: MNRJ 40189-40191; Santa Teresa: MBML 2573; São Mateus: CFBH 1961, MBML 1677; Serra: MBML 5101-5102; Sooretama: CFBH 26523; Vitória: MBML 7124).

Rhinella hoogmoedi (Sooretama: MZUSP 108370-108376).

Rhinella pygmaea (Mimoso do Sul: ZUFRJ 8987-8989, Presidente Kennedy: MBML 6164).

Rhinella schneideri (Conceição da Barra: CFBH 2878-2879; Linhares: MBML 233-235; Santa Teresa: MBML 687; São Mateus: MNRJ 18444).

Scinax agilis (Conceição da Barra: CFBH 1938-1940; Guarapari: CFBH 1358; Itapemirim: MBML 4887; Linhares: EI 7123 - Holotype; São Mateus: CFBH 1567; Sooretama: EI 7155-7156; Vila Velha: EI 7124-7138; Vitória: MBML 4903).

Scinax alter (Alfredo Chaves: MBML 6292-6294; Anchieta: MBML 6548-6550; Aracruz: CFBH 5361-5362; Cachoeiro de Itapemirim: MBML 1725-1727; Cariacica: MBML 4774-4776; Castelo: MBML 1598; Colatina: MNRJ 1260; Conceição da Barra: CFBH 1922-1923; Domingos Martins: CFBH 1472; Fundão: MBML 4787-4788; Guarapari: MBML 4784-4786; Itapemirim: MBML 4799-4801; Itarana: MBML 4197; Linhares: CFBH 1032-1033; Marechal Floriano: MBML 5854-5855; Mimoso do Sul: CFBH 11103-04; Montanha: MBML 4276; Muniz Freire: CFBH 4108; Presidente Kennedy: MNRJ 24804-24805; Santa Leopoldina: MNRJ 4030 - Holotype; Santa Teresa: MBML 2440-42; São Mateus: CFBH 1518,1531; Serra: CFBH 1422,1484; Vitória: CFBH 1352-53).

Scinax arduous (Afonso Cláudio: MBML 5663-5668; Itarana: MBML 6805-6808; Santa Teresa: WCAB 44833 - Holótipo, MNRJ 34926-29).

Scinax argyreornatus (Anchieta: MBML 0799; Aracruz: CFBH 4495-98; Cariacica: MBML 5062-65; Colatina: MNRJ 114A - Lectotype; Domingos Martins: MNRJ 24950-24955; Fundão: MBML 0723; Guaçuí: MNRJ 30865; Guarapari: MBML 6656-67; MBML 2371-72; Linhares: MBML 2370-2372; Marilândia: MBML 2650; Santa Teresa: MBML 0854-57; São Mateus: CFBH 1624-25; Sooretama: MNRJ 35009; Vila Velha: MBML 5356-58; Vitória: MBML 4441).

Scinax belloni (Castelo: CFBH 9733 - Holotype; Muniz Freire: CFBH [Field Number JLG MF 057]).

Scinax cuspidatus (Anchieta: MBML 0803; Cariacica: MBML 6110; Conceição da Barra: CFBH 2387; Guarapari: MBML 6314; Ibiraçu: MBML 6717; Linhares: MBML 2435; Presidente Kennedy: MNRJ 24802-24803; Santa Teresa: MBML 3594-3595; São Mateus: CFBH 1645-48;

Scinax eurydice (Aracruz: CFBH 4033-4034; Cachoeiro de Itapemirim: CFBH 4069; Cariacica: MBML 5422; Conceição da Barra: CFBH 2386; Fundão: MBML 0775; Guarapari: CFBH 9696-9697; Linhares: ZUEC 8609; Santa Leopoldina: MNRJ 16744-16746; Santa Teresa: MBML 1126, 1128; São Mateus: CFBH 1962-1963; Sooretama: ZUEC 0536).

Scinax cf. *fuscovarius* (Alfredo Chaves: MBML 6301; Anchieta: MBML 1497-1499; Aracruz: Cariacica: MBML 0193, 5283; Castelo: MBML 2643; Colatina: MBML 2513-2514; Conceição da Barra: MBML 1314; Domingos Martins: MBML 6635; Itapemirim: MBML 5282; Linhares: MBML 2400-2401; Montanha: MBML 4278-4280; Muniz Freire: CFBH 4107; Nova Venécia: MBML 2645-2647; Santa Teresa: MBML 508-510; Serra: MBML 5006).

Scinax hayii (Marechal Floriano: MBML 4459; Santa Teresa: MBML 4707-4708; Vargem Alta: CFBH [Field number JLG VA078]).

Scinax heyeri (Cariacica: MBML 5496; Santa Teresa: MZUSP 61094 - Lectotype; Serra: MBML 4902; Vargem Alta: CFBH 0000); *Scinax humilis* (Cariacica: MBML 5410-5412).

Scinax kautskyi (Aracruz: MNRJ 39785-39790; Cariacica: MNRJ 27889-27890; Domingos Martins: SPCS 2012 - Holotype; Santa Teresa: MNRJ 34910).

Scinax cf. *similis* (Aracruz: CFBH 4030-4032; Conceição da Barra: CFBH 4156-4157; Linhares: MBML 2409-2412).

Scinax v-signatus (Santa Teresa: EI 7600).

Scinax cf. *x-signatus* (Santa Teresa: MBML 4541-42, 4481, MNRJ 34578-79, 34912-13; Sooretama: MNRJ 3757).

Sphaenorhynchus botocudo (Mucurici: MNRJ 50625 - Holotype; Pedro Canário: MBML 4292).

Sphaenorhynchus mirim (Mucurici: MNRJ 50641 - Holotype).

Sphaenorhynchus palustris (Conceição da Barra: CFBH 2375-2377, MNRJ 30049-30050; Linhares: ZUEC 8591-8594; Pinheiros: ZUEC 3604-06; Sooretama: WCAB 19235 - Holotype).

Sphaenorhynchus pauloalvini (Linhares: MNRJ 4303-4329, CFBH 22931-

22935).
Sphaenorhynchus planicola (Anchieta: MBML 3582-83; Aracruz: CFBH 5365; Conceição da Barra: CFBH 4154-55; Fundão: CFBH 1586; Guarapari: MBML 1789; Linhares: MNRJ 4330-4332, CFBH 1575-76; Marataízes: MNRJ 35025-27; Presidente Kennedy: MBML 6174-75; São Mateus: CFBH 1640-42; Serra: CFBH 1439-40; Vitória: MBML 4112).
Sphaenorhynchus prasinus (Linhares: MNRJ 4298-4302; São Mateus: CFBH 1636-1639).
Stereocyclops incrassatus (Aracruz: CFBH 5997; Cariacica: MBML 6817; Conceição da Barra: MBML 1319, 5604; Linhares: CFBH 5994-5595; São Mateus: MCZ 855 (MCZ1525) - Holotype, CFBH 1486; Sooretama: CFBH 0249).
Thoropa lutzii (Mimoso do Sul: photographed specimen only; Muniz Freire: MNRJ 26159; Santa Teresa: MNRJ 1373).
Thoropa miliaris (Afonso Cláudio: CFBH 1475; Alegre: MBML 1631,1634; Alfredo Chaves: MBML 6291; Cachoeiro de Itapemirim: CFBH 4068; Cariacica: MBML 5550; Castelo: CFBH 9737; Colatina: MBML 3145-3150; Domingos Martins: MBML 7055; Fundão: MBML 2105,2107; Ibiraçu: MBML 6716; Itarana: MBML 6795-6797; Linhares: CFBH

26379-26385, MBML 179-180; Mimoso do Sul: EI 2599-2600; Muniz Freire: MBML 1766-1770; Muqui: MBML 4442-43; Santa Leopoldina: MBML 5185; Santa Teresa: CFBH 5371-5373; Serra: MBML 5182-5183; Vitória: MBML 842-845).
Thoropa petropolitana (Santa Teresa: MZUSP 27723, MZUSP 27725-29, 27732-33, MZUSP 27718).
Trachycephalus mesophaeus (Cariacica: MNRJ 30987; Conceição da Barra: MBML 5605; Fundão: MBML 777; Governador Lindenberg: CFBH 23111-23113; Linhares: CFBH 23105-23109; Santa Teresa: MBML 616; Sooretama: MNRJ 3487-3501; Vila Valério: MBML 6696).
Trachycephalus nigromaculatus (Anchieta: MBML 7040; Aracruz: CFBH 4035; Baixo Guandu: MBML 174; Cariacica: MBML 5178; Fundão: MBML 1271-1272, 5384; Guarapari: MBML 4979-4980; Linhares: CFBH 22913-22918; Presidente Kennedy: CHUNB 25037-250]40, MBML 4670; Santa Teresa: MNRJ 1341-1343).
Vitreorana eurygnatha (Santa Teresa: MBML 4113, MNRJ 3740).
Vitreorana uranoscopa (Santa Teresa: MBML 3725).
Zachaeus carvalhoi (Cariacica: CFBH 23630; Ibitirama: MZUSP 140431-140432; Santa Teresa: EI 7243 - Holotype).